

## Notice of Allowability

Application No.

10/825,469

Examiner

Stephen R. Koziol

Applicant(s)

HORNEGGER, JOACHIM

Art Unit

2624

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 01/18/2008.
2. ☒ The allowed claim(s) is/are 1-3.
3. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) ☒ All    b) ☐ Some\*    c) ☐ None    of the:
    1. ☒ Certified copies of the priority documents have been received.
    2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).
  - \* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.  
**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS ( as "replacement sheets") must be submitted.
  - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review ( PTO-948) attached
    - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
  - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

### Attachment(s)

1. ☒ Notice of References Cited (PTO-892)✓
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO/SB/08),  
Paper No./Mail Date \_\_\_\_\_
4. ☐ Examiner's Comment Regarding Requirement for Deposit  
of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☐ Interview Summary (PTO-413),  
Paper No./Mail Date \_\_\_\_\_
7. ☐ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance✓
9. ☐ Other \_\_\_\_\_

Allowable Subject Matter

1. Claims 1-3 are allowed.
2. The following is an examiner's statement of reasons for allowance:

The present invention as claimed involves a method for performing digital subtraction angiography. The method comprises the steps of calculating a first 2D x-ray image of a body region from a provided 3D volume dataset obtained with contrast agent enrichment; generating a second 2D x-ray image of said body region with contrast agent enrichment; and subtracting said first 2D x-ray image from said second 2D x-ray image. By obtaining the first 2D x-ray image from a provided 3D volume dataset without contrast agent enrichment, a patient is exposed to fewer cumulative doses of radiation over the course of treatment.

The prior art of record fails to anticipate or render obvious the limitations as highlighted above. The cited references teach methods of digital subtraction angiography comprising registering sets of 2D computed tomography (CT) x-ray slices of a body region (e.g. spinal, coronary and cranial structures) to form a 3D volume dataset (see, e.g., Adler et al. U.S. 6,023, 495). Such 3D volume datasets are then used in performing digital subtraction angiography. For example, Bani-Hashemi et al., U.S. 5,647,360 teaches a diagnostic imaging method involving digital subtraction angiography using 3D datasets generated from known computed tomography techniques. A mask volume (obtained without contrast agent) and a contrast volume (obtained with contrast agent) of a body region are acquired, processed, and subtracted from each other (volumetrically) to complete the digital subtraction angiography 3D diagnostic imaging method. However, such prior art does not teach using provided 3D volume datasets to calculate a first 2D x-ray image without contrast agent and then subtracting said first 2D x-ray image from a second

2D x-ray image obtained with contrast image. Notably the cited references differ from the present Claim 1 in that they expose a patient to doses of x-ray radiation not required by the method of present Claim 1 (due to the need for additional CT scans over the length of treatment). Present Claim 1, by contrast, reduces the patient's redundant exposure to x-ray radiation by calculating the first 2D x-ray slice from a provided 3D volume dataset.

In "2D-3D Rigid-Body Registration of X-Ray Fluoroscopy and CT Images" by Lilla Zöllei, Department of Electrical Engineering and Computer Science, Massachusetts Institute of Technology, August 2001, Zöllei indicates the desirability of "*using a 3D dataset as the reference from which synthetic 2D images can be generated*" (page 18) and indicates that such a project has been proposed. However, Zöllei's disclosure is not sufficient to enable one skilled in the art to arrive at the present Claim 1.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

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*Contact*

3. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Steve Koziol whose telephone number is (571) 270-1844. The examiner can normally be reached on M - alt. F 8:00-5:30 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Samir Ahmed can be reached at (571) 272-7413. Customer Service can be reached at (571) 272-2600. The fax number for the organization where this application or proceeding is assigned is (571) 273-7332.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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SUPERVISORY PATENT EXAMINER